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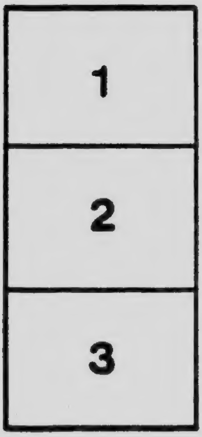

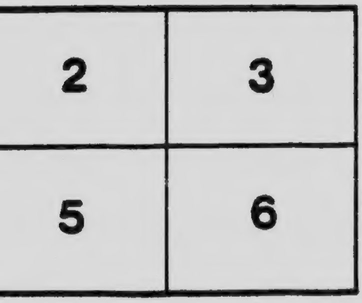

DEPARTMENT OF THE INTERIOR, CANADA
Hon. Frank Oliver, Minister ; W. W. Cory, Deputy Minister
FORESTRY BRANCH—BULLETIN No. 28.
R. H. Campbell, Director of Forestry.

# FOREST PRODUCTS OF CANADA

## 1910

## TIMBER USED IN MINING OPERATIONS

COMPILED BY
H. R. MACMILLAN, B.S.A., M.F.
Assisted by BRUCE ROBERTSON and GUY BOYCE

OTTAWA
GOVERNMENT PRINTING BUREAU
1911

DEPARTMENT OF THE INTERIOR, CANADA
Hon. Frank Oliver, Minister ; W. W. Cory, Deputy Minister
FORESTRY BRANCH—BULLETIN No. 23.
R. H. Campbell, Director of Forestry.

# FOREST PRODUCTS OF CANADA

## 1910

## TIMBER USED IN MINING OPERATIONS

COMPILED BY
H. R. MACMILLAN, B.S.A., M.F.
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OTTAWA
GOVERNMENT PRINTING BUREAU
1911

## LETTER OF TRANSMITTAL.

FORESTRY BRANCH,
DEPT. OF THE INTERIOR,
OTTAWA, Sept. 15, 1911.

SIR.—I have the honour to transmit herewith a statistical report on the "Timber used in Mining Operations" in the Dominion of Canada during 1910, and to recommend its publication as Bulletin No. 23 of this Branch.

The bulletin summarizes the amount of timber used, both round and sawn, in the mines of the Dominion and of the several provinces during the year specified, and gives also the quantity of wood of the different species.

I have the honour to be, Sir,
Your obedient servant,
R. H. CAMPBELL,
*Director of Forestry.*

W. W. CORY, C.M.G.,
Deputy Minister of the Interior,
Ottawa.

# TIMBER USED IN MINING OPERATIONS.

These statistics of the timber used in the mines of Canada in 1910 are based upon reports received from 136 coal and ore mines throughout the various provinces, as follows: British Columbia 59, Ontario 27, Alberta 20, Nova Scotia 15, Yukon Territory 9, Saskatchewan 4, Manitoba 2. These represent practically all the mines using timber in any quantity. There are a large number of mines in Canada which do not use timber in their operations.

In the tables two main divisions have been made, viz.: round timbers and sawn timbers. The round timbers are used underground to give artificial support for insecure roofs or walls and to protect shafts, drifts and gangways. The sawn timber reported is mostly lumber, together with a small quantity of square timber, and was used principally above ground for buildings, breakers, tipples, washers and trestles. A small quantity was used underground for sets, stulls and ventilator shafts.

Including round and sawn timbers, timber to the value of $827,337 was used in Canada during 1910 for mining purposes.

This total is made up of 52,848,000 linear feet of round timber, worth $523,339, and 22,305,000 board feet of sawn timber which cost $303,998.

The various species of woods used by mining industries are chosen, not because of their superior technical qualities, but because of their cheapness, suitable size and accessibility. Thus, Douglas fir is the most-used mining timber because it grows in the province where most of the mining is done and is easily obtained. When this is understood, it is easily seen why the use of each species is confined to one province. British Columbia used all the Douglas fir; Nova Scotia used practically all the spruce, balsam, hemlock, birch, beech and maple; Alberta used almost all the jack pine and poplar.

## Round Timber.

Table 1 shows by provinces the quantity and value of the round timber used by mines in Canada during 1910.

TABLE 1.

ROUND MINING TIMBER, 1910, BY PROVINCES: QUANTITY, VALUE, AVERAGE COST AND PER CENT DISTRIBUTION.

| Province or District. | Quantity | Per cent Distribution. | Value. | Average cost per M linear ft. |
|---|---|---|---|---|
| | M linear ft. | | $ | $ c. |
| Canada | 52,848 | 100· | 523,339 | 9·90 |
| British Columbia | 29,047 | 55·0 | 203,597 | 7 01 |
| Nova Scotia | 15,653 | 29·5 | 168,142 | 10 74 |
| Alberta | 7,484 | 14·1 | 132,900 | 17 75 |
| Ontario | 549 | 1·2 | 14,724 | 26 83 |
| Saskatchewan | 105 | 0·2 | 3,597 | 34 25 |
| Yukon | 10 | * | 379 | 37 90 |

*Less than one-tenth of one per cent.

The mines of Canada used, in 1910, 52,848,000 linear feet of round timber, which cost $523,339. This is an average cost of $9.90 per thousand.

British Columbia alone used 55 per cent of this consumption, *i.e.*, 29,047,000 linear feet, at an average cost of $7.01 per thousand. This is a lower price for round timber than in any other province, the smallness of price being due to the fact that nearly 20,000,000 feet of this amount was four to six inch Douglas fir, used by two of Canada's largest coal companies for lagging.

Nova Scotia, using 30 per cent of the Canadian consumption, is second in importance; 15,653,000 linear feet were used at a cost of $168,142. The price thus averages $10.74 per thousand linear feet, and is, after that current in British Columbia, the lowest price. Spruce five inches in diameter formed a great proportion of this province's consumption.

Alberta used 7,484,000 linear feet or 14 per cent of the total. This quantity cost an average of $17.75 per thousand. Over 70 per cent of this was small lodgepole pine. Spruce made up nearly 25 per cent and the balance was mostly Douglas fir.

The foregoing three provinces, namely, British Columbia, Nova Scotia and Alberta, contain all the important coal mines in Canada, and consume 98.6 per cent of the timber used in mining. The remaining 1.4 per cent was used in Ontario for ore-mining and in Saskatchewan and Yukon for small coal mines supplying local demands.

Ontario mines used 549,000 linear feet at an average cost of $26.83 per thousand. Nearly one-half of this was spruce five to seven inches in diameter; one-third was pine of small diameters. The remaining one-sixth was tamarack and timber of unspecified species. The mines in Ontario use, so far, a very small amount of timber per mine as compared with the large mines of British Columbia. Most of the Ontario mines are small and shallow, and are excavated in the solid rock, so that little timber is required for protection. Moreover, a great number of the mining companies incorporated in this province have not advanced sufficiently far in their operations to require any timber.

Saskatchewan has a very small number of coal companies, only one of which sells to the public; 105,000 linear feet were used in this province and cost, on an average, $34.25 per thousand. The high price of this timber is due to transportation charges, either from the spruce and tamarack belt of northern Saskatchewan or from the Rocky Mountains.

Ten thousand linear feet of spruce were used by the coal and gold mining companies of the Yukon territory at an average cost of $37.90 per thousand. This is all native wood and the high cost of this amount is due to expensive labor. The small quantity of timber reported from Yukon is explained by the small number of deep mines. Mining operations do not extend far below the surface, and therefore there is no great necessity for timbering.

Table 2 shows by relative importance of species, the round timber used in Canada in 1910.

## TIMBER USED IN MINES, 1910.

### TABLE 2.

ROUND MINING TIMBER, 1910, BY SPECIES: QUANTITY, VALUE, PER CENT DISTRIBUTION AND AVERAGE COST PER THOUSAND LINEAR FEET.

| Species. | Quantity | Per Cent Distribution. | Value. | Average Cost per M linear ft. |
|---|---|---|---|---|
| | M linear ft. | | $ | $ c. |
| *Total | 52,848 | 100 | 523,339 | 9 90 |
| Douglas Fir | 28,268 | 53·8 | 198,776 | 7 03 |
| Spruce | 14,417 | 27·5 | 179,734 | 12 46 |
| ‡Jack Pine | 4,455 | 8·5 | 66,751 | 14 98 |
| Balsam | 2,170 | 4·1 | 21,215 | 9 78 |
| Hemlock | 1,172 | 2·3 | 15,691 | 13 39 |
| Tamarack or Larch | 893 | 1·7 | 15,029 | 16 72 |
| Pine | 720 | 1·4 | 10,234 | 14 21 |
| Birch | 326 | ·6 | 4,311 | 13 22 |
| Poplar | 54 | ·1 | 848 | 15 70 |
| Cedar | 23 | † | 1,107 | 48 13 |
| Maple | 1 | † | 11 | 11 00 |
| Beech | 1 | † | 11 | 11 00 |

*The total includes a small amount of timber not identified by species.
‡Includes jack pine and lodgepole pine.
†Less than one-tenth of one per cent.

The mines of Canada reported the use of twelve species of wood in their mining operations.

Douglas fir alone was used to the extent of 53.8 per cent of the total represented by the twelve species. 28,268,000 linear feet of fir was used, which cost $198,776. This is an average of $7.03 per thousand, which is the smallest price paid for any species. Fir is a very popular wood for mining purposes, particularly in British Columbia, on account of its accessibility and strength.

Spruce stands second in importance and contributed over one-quarter of the total; 14,417,000 linear feet were used at a cost of $179,734. This is an average cost of $12.46 per thousand. The great quantity of spruce is due to its occurrence in Nova Scotia, where it is used by most of the coal mines. Although in amount nearly twice as much fir was used as spruce, in value fir was worth only $19,042 more than spruce; this is due to the difference of $5.37 per thousand feet in the cost of spruce over that of fir.

Jack pine was the third important species; 4,455,000 feet were used, at a cost of $66,751. This is an average cost of $14.98 per thousand. The entire quantity of jack pine mining timber was used in Alberta. Two species of pine are included under jack pine. The one is the true jack pine, *(Pinus Banksiana).* and the other is lodgepole pine *(Pinus Murrayana).* Lodge pole pine occurs extensively on the slopes of Alberta and British Columbia and comprises 90 per cent of the so-called 'jack pine' listed.

Hemlock, which was the cheapest species of lumber produced in Canada in 1909, formed only 2.3 per cent of the total consumption of mining timbers in 1910. Nova Scotia used all the hemlock, 1,172,000 feet, at an average cost of $13.39 per thousand. Very little hemlock grows in the mining districts of Canada.

The above five species (Douglas fir, spruce, jack pine, balsam and hemlock), of which jack pine was the most expensive, were the important woods used by the mining industries, forming over 96 per cent of the total quantity of the twelve species reported.

Tamarack or larch was used to the extent of 893,000 feet, and cost $15,029. This is an average cost of $16.72 per thousand linear feet, the highest price paid for any mining timber except cedar. Over 700,000 feet of this was used in British Columbia; 158,000 feet was used in Alberta, and the remainder was about equally divided between Saskatchewan and Ontario. Larch is a splendid mining timber, but its use is limited by its scarcity.

Five-sevenths of all the pine used was consumed in British Columbia coal mines. Ontario ore mines used nearly all the balance. The pine used in British Columbia is yellow pine and western white pine. The total pine used was 720,000 feet and cost $14.21 per thousand linear feet. Small quantities of red and white pine were used in Ontario.

Birch formed less than one per cent of the total; 326,000 feet were used in all, costing $4,311. This is an average of $13.22 per thousand linear feet. All the birch mining timbers were used in Nova Scotia.

All the poplar used, 54,000 feet, at $15.70 per thousand, was used in Alberta. Poplar is cheap and accessible, but is not sufficiently durable for use in mines.

One thousand feet each of maple and beech were used in Nova Scotia at $11.00 per thousand.

There were also used 348,000 feet of timber, the kind of which was not specified. It came principally from the provinces of Ontario and Nova Scotia, and averaged in price $27.62 per thousand.

In table 3 is given the quantity, total cost and average cost of the round mining timbers used in Canada, 1910, by diameter-classes and species.

TABLE 3.

ROUND MINING TIMBERS, 1910, BY DIAMETER-CLASSES AND SPECIES: TOTAL QUANTITY, TOTAL COST AND AVERAGE COST.

| | CLASS 1—UNDER 5 IN. | | | CLASS 2—5 IN. TO 9 IN. | | | CLASS 3—10 IN. AND OVER. | | |
|---|---|---|---|---|---|---|---|---|---|
| Species. | Quantity. | Value. | Average Cost. | Quantity. | Value. | Average Cost. | Quantity. | Value. | Average Cost. |
| | M lin. ft. | $ | $ c. | M lin. ft. | $ | $ c. | M lin. ft. | $ | $ c. |
| *Total | 19,046 | 50,765 | 2 66 | 31,967 | 403,171 | 12 63 | 1,835 | 69,403 | 37 82 |
| Douglas Fir | 17,411 | 40,583 | 2 33 | 10,110 | 130,617 | 12 92 | 747 | 27,576 | 36 92 |
| Spruce | 445 | 3,716 | 8 35 | 13,116 | 148,807 | 11 32 | 856 | 27,211 | 31 80 |
| Jack Pine | 1,156 | 6,132 | 5 30 | 3,216 | 55,497 | 17 25 | 83 | 5,122 | 61 60 |
| Balsam | ........ | ........ | ........ | 2,170 | 21,215 | 9 77 | ........ | ........ | ........ |
| Hemlock | ........ | ........ | ........ | 1,155 | 14,123 | 12 23 | 17 | 1,568 | 92 30 |
| Tamarack or Larch | ........ | ........ | ........ | 801 | 9,596 | 11 98 | 92 | 5,433 | 59 05 |
| Pine | ........ | ........ | ........ | 688 | 8,361 | 12 15 | 32 | 1,873 | 58 53 |
| Birch | 1 | 11 | 11 00 | 325 | 4,300 | 13 23 | ........ | ........ | ........ |
| Poplar | ........ | ........ | ........ | 54 | 848 | 15 70 | ........ | ........ | ........ |
| Cedar | ........ | ........ | ........ | 15 | 487 | 33 47 | 8 | 620 | 77 50 |
| Maple | 1 | 11 | 11 00 | ........ | ........ | ........ | ........ | ........ | ........ |
| Beech | 1 | 11 | 11 00 | ........ | ........ | ........ | ........ | ........ | ........ |

*Includes a small amount of timber not identified by species.

Of the 52,848,000 linear feet of round timber used in Canada during 1910, 31,967,000 feet were from 5 to 9 inches in diameter. Timber of this size cost, on an average, $12.63 per thousand, and was used for various purposes; 5 to 6 inch timber was used for caps 2 to 10 feet long and for ties, 6 to 8 inch timber for long caps and 12 to 16 foot booms, 5 to 9 inch material for props. In some mines, where the seam was narrow, four inch timber was used for props.

The class 'under five inches in diameter' includes 19,046,000 feet, or over one-third of the total consumption. This cost on an average only $2.66 per thousand linear feet. It is used mainly for pinning and lagging. For pinning it is used in short lengths; for lagging it is used in lengths varying from eight to twelve feet.

There were used 1,835,000 linear feet over ten inches in diameter. This timber cost, on an average, $37.82 per thousand and included the best quality of timber used in the mining industry. These large-sized timbers are used for heavy props and in gangways. For such purposes timbers are used up to three feet in diameter.

In comparing the prices of different species in the same class, consideration should be given to the fact that the diameter varies a great deal within each class.

Of the Douglas fir used in the mining industry, 17,411,000 linear feet was less than five inches in diameter and cost only $2.33 per thousand. The timber used under five inches diameter was practically all Douglas fir and was used by the large coal companies of British Columbia. Of timber varying from five to nine inches in diameter, 10,110,000 linear feet were used, which cost $12.92 per thousand feet. Fir also stands second in importance in the largest diameter class; 747,000 feet were used, which cost, on an average, $36.92 per thousand linear feet.

Spruce was used to the extent of 445,000 feet in the class under five inches in diameter. This species was used more in the five-to-nine-inch class than any other species, the amount being 13,116,000 feet. The 856,000 feet over ten inches in diameter was all used in Alberta. Spruce of the first diameter-class cost $8.35 per thousand, while fir of this size cost only $2.33 in British Columbia. This apparent inconsistency is due to the fact that the spruce was used for props and the fir for lagging. The large spruce was all used in Alberta and cost $31.80 per thousand, less than the cost of big timbers in any other province.

Jack pine was important mainly in the second diameter-class; 3,216,000 linear feet of this dimension was used in Alberta, costing $17.25 per thousand. To a small extent this species was also used in the third diameter-class, and cost $61.60 per thousand. 1,156,000 feet of jack pine under five inches in diameter was used in Alberta, and cost $5.30 per thousand, making it next to Douglas fir in cheapness in this class.

The use of balsam was confined to the second diameter-class and consisted of 2,170,000 linear feet at an average of $9.77 per thousand. Balsam appears as the cheapest species in this class, because it was all five-inch timber used by a Nova Scotia company. It is a weaker and less durable wood than spruce or hemlock, and is worth less for mining purposes

Hemlock was used only in two classes. In the second diameter-class 1,155,000 feet were used, costing $12.23 per thousand. In British Columbia 17,000 feet used ranged from 10 to 36 inches in diameter. These large-sized timbers made the average cost $92.30 per thousand linear feet, the highest price paid for mine timbers.

Of tamarack or larch, 801,000 feet, five to nine inches in diameter, was used throughout the various provinces and cost an average of $11.98 per thousand. Larch to the extent of 92,000 feet of 10 inches or more in diameter was used in British Columbia It cost on the average $59.05 per thousand feet.

Pine, birch and poplar were used in small quantity and practically all ranged from five to nine inches in diameter. The term 'pine', as used in Table 3, includes western yellow pine, western white pine, red pine and white pine: of this timber 96 per cent belonged to the first diameter-class and four per cent to the third diameter-class.

In Alberta there were used 54,000 linear feet of poplar five to six inches in diameter, which cost, on an average, $15.70 per thousand.

Cedar was used only in British Columbia and of the small cut of 23,000 feet used two-thirds were in the medium class and one-third in the largest class. Cedar was used chiefly in the gold mines.

One thousand feet each of maple and beech were used in Nova Scotia; this was small-sized timber.

Less than one per cent of the total amount of round mining timbers reported was of undetermined species; 317,000 feet were five to nine inches in diameter, and cost $29.90 per thousand. A very small amount, 31,000 feet, of ties were not specified, and cost $9.70 per thousand linear feet.

## Sawn Timber.

Table 4 shows the quantity and value of sawn timber used in the mines of Canada during 1910, by provinces

TABLE 4.

SAWN MINING TIMBER, 1910, BY PROVINCES: QUANTITY, VALUE, PER CENT DISTRIBUTION AND AVERAGE COST PER THOUSAND FEET, B. M.

| Province | Quantity | Per Cent Distribution. | Value. | Average Cost per M Board Ft. |
|---|---|---|---|---|
| | M Board Ft | | $ | $ c. |
| Canada | 22,305 | 100 | 303,998 | 13 63 |
| British Columbia | 11,933 | 53·5 | 146,510 | 12 28 |
| Alberta | 5,569 | 25·1 | 77,114 | 13 85 |
| Nova Scotia | 3,282 | 14·8 | 45,281 | 13 80 |
| Ontario | 1,390 | 6·4 | 29,470 | 21 20 |
| Yukon | 105 | * | 5,025 | 47 85 |
| Saskatchewan | 26 | * | 598 | 23 00 |

*Less than one-tenth of one per cent.

22,305,000 board feet of sawn timber were used, representing an expenditure of $303,998. This is an average of $13.63 per thousand. British Columbia used over fifty per cent of this amount, of which the principal species was Douglas fir. The price of sawn lumber in British Columbia was only $12.28 per thousand, less than in any other province.

It is impossible to give correctly the species of sawn timber used in the various provinces, as the reports did not always state the species, but in most cases the sawn timber would be the same species as the round timber.

Alberta used twenty five per cent of the total sawn timber, seven different species of wood being utilized.

Fifteen per cent of the total consumption was used in Nova Scotia. Spruce was the principal species used in this province.

Ontario used about equal amounts of pine and spruce to make up the 1,390,000 board feet of sawn timber used in this province Yukon and Saskatchewan used very small amounts. Yukon paid the highest average price for sawn timber, (namely, $47.85), most of which was spruce

Table 5 shows by relative importance of species the amount and value of sawn timber used in Canadian mines during 1910.

TABLE 5.

SAWN MINING TIMBER, 1910, BY SPECIES: QUANTITY, VALUE, PER CENT DISTRIBUTION AND AVERAGE COST PER THOUSAND FEET, B.M.

| Species. | Quantity | Per Cent Distribution. | Value. | Average Cost per M Board Ft. |
|---|---|---|---|---|
| | M Board Ft | | $ | $ c. |
| *Total | 22,305 | 100 | 303,998 | 13 63 |
| Douglas Fir | 10,107 | 56·7 | 104,151 | 10 25 |
| Spruce | 3,689 | 20·8 | 57,622 | 18 33 |
| Tamarack or Larch | 1,540 | 8·6 | 21,586 | 14 01 |
| Pine | 743 | 4·2 | 14,385 | 19 39 |
| Cedar | 614 | 3·5 | 6,070 | 9 90 |
| Jack Pine | 539 | 3·0 | 8,121 | 15 09 |
| Hemlock | 361 | 2·0 | 5,055 | 14 00 |
| Birch | 148 | ·9 | 1,821 | 12 30 |
| Oak | 48 | ·2 | 4,285 | 89 25 |
| Balsam | 12 | ·1 | 420 | 35 00 |
| Maple | 4 | ‡ | 102 | 24 28 |
| Beech | 3 | ‡ | 71 | 20 28 |
| Poplar | 3 | ‡ | 95 | 27 14 |
| Cypress | 4 | ‡ | 48 | 110 09 |

*Includes a small amount of timber not identified by species.
‡Less than one-tenth of one per cent.

Douglas fir was the most important species used for sawn timber, forming 56 per cent of the total; 10,107,000 feet were used at an average cost of $10.25 per thousand, the smallest average price paid for sawn mining timbers, except cedar. Spruce was used to the extent of 3,689,000 board feet and formed over one-fifth of the total consumption. Spruce was much more expensive than fir, costing $18.33 per thousand. The two species just mentioned, namely, fir and spruce, alone formed over three-quarters of the total amount of the sawn timbers used. Tamarack (larch), pine, cedar jack pine, hemlock, and birch were used in small quantities and ranged in price from $9.90 per thousand feet for cedar to $19.39 for pine; 48,000 feet of oak were used, mostly by the metal mines of northern Ontario. The average cost of this timber was $89.25 per thousand feet; 436 feet of cypress at $110.00 per thousand were also used by one mine of this province.

## Preservation.

The preservation of mine timbers by chemical treatment has not yet been adopted by the mining industries of Canada. In many localities, however, the distances required to transport mining timbers are becoming greater, poorer qualities of woods have to be used and the annual cost of the upkeep of mine timbering is becoming greater. In the United States much has been done in the treatment of mine timbers and it has been proven that a treatment of creosote or zinc chloride decreases the destruction due to decay, fire and insects. This increases the life of the timbers and decreases the annual cost of replacing mine timbers. Timber used in mines has, on the average, a shorter life than wood used for any other purpose. The surroundings in a mine are very conducive to rot, which, after a period of three to five years, causes the timber to break, crumble and become useless. Experiments have been conducted in United States mines with a row of untreated and treated mine props alternately placed. In one instance, after 18 months, every untreated stick was weakened by decay and broken, while the treated props were sound and useful. From various practical experiments of this kind with different species of wood important results have been obtained.

Douglas fir has an average of five years life when untreated. Treated, it lasts twelve years. Hemlock, lasting as a natural wood five years, doubles its term of life when treated, as does tamarack. Spruce is one of the species which decays quickest when untreated, lasting only three years. If treated it will last twelve years, thereby increasing its life 300 per cent. To sum up, wood preservation not only prolongs the life of durable timbers, thus decreasing their annual consumption, but also permits the substitution of inferior species, whose use considerably reduces the drain upon the more desirable kinds.

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